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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,298	05/31/2007	Shinichi Wada	060656	9228

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EXAMINER	
KIM, JOHN K	

ART UNIT	PAPER NUMBER
4125	

MAIL DATE	DELIVERY MODE
12/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,298	WADA ET AL.	
	Examiner	Art Unit	
	JOHN K. KIM	4125	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/31/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

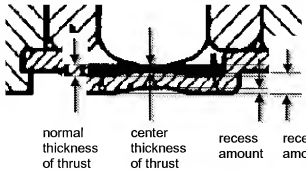
DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

Line 26-29, page 3 recites ".... a thrust sheet which is thinner than a recess amount of the thrust cap is provided between the thrust cap and the shaft". However, Fig. 1 shows the thickness of thrust sheet (even if compared to the thickness at center) is thicker than recess amount (see sketch below). If the 'recess amount' indicates 'recess amount (2)' as shown in sketch below, the thrust sheet can be thinner than the recess amount.

The thickness of thrust sheet mentioned in the same sentence above is not uniform according to Fig. 1. Therefore, it is not clear which portion of the sheet is referred for comparison. The examiner understands the thickness at the center portion is of interest. Appropriate correction is required.



2. The abstract of the disclosure is objected to because element numbers used to indicate the corresponding elements are not put in parentheses. Correction is required. See MPEP § 1826.

Drawings

3. The drawings are objected to because the limitation in claim 6, the thickness of thrust sheet being thinner than recess amount, is not shown in drawings. According to Fig. 1, the thickness of thrust sheet (even if compared to the thickness at center) is thicker than recess amount if it means the height produced by recessing the thrust cap.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As for claim 6, the claim recites "…. a thrust sheet which is thinner than a recess amount of said thrust cap is provided between said thrust cap and said shaft". The sentence is not clear to understand. The thickness of thrust sheet, however, is not uniform according to Fig. 1 as the center portion of the sheet is thinner than outer portions. For the purpose of examination, the examiner interprets "… a thrust sheet which is thinner than a recess amount of said thrust cap provided between said thrust cap and said shaft" , thickness of thrust sheet indicates the thickness at the center portion and the recess amount means the height from upper surface to bottom of the thrust cap.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukutani (US 6700256).

As for claim 1, Fukutani teaches (in Fig. 1 and 3) a disk apparatus comprising a rotor frame in which disk holding member (17) is placed on a center of an upper surface of rotor frame (2), a shaft (1) mounted on a center of said rotor frame, a bearing metal (5) which holds said shaft, a holder (9) which is disposed on an outer periphery of said bearing metal (5) and which holds said bearing metal, a stator (14) disposed on an outer periphery of said holder (9), a magnet (3) fixed to said rotor frame (2) at a location opposed to said stator (14), and a thrust cap (8) fixed to a center of a lower portion of said holder (9), in which an outer periphery of the lower portion of said holder is swaged and fixed to a motor plate (11), and said shaft (1) is disposed between said disk holding member (17) and said thrust cap (8), wherein said rotor frame (2) at the location opposed to said bearing metal (5) is projected toward said disk holding member (17), thereby forming a bearing metal space (space between 2 and 9 near to the shaft 1) in a lower portion of a center of said rotor frame (2), and an upper end of said bearing metal (5) is brought closer to said rotor frame (2).

As for claim 9, Fukutani clearly shows and discloses the claimed invention as applied to claim 1 above. Fukutani further teaches (in Fig. 1) a thickness of a projection (16) of rotor frame (2) located above bearing metal (5) is made thinner than a basic

thickness of rotor frame (2). Projection of rotor frame by drawing or crushing operation is a product by process limitation whose patentable weight is very little.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 2-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukutani et al (US 6700256) in view of Shiraki et al (US 6465927).

As for claim 2, Fukutani clearly shows and discloses the claimed invention as applied to claim 1 above. Fukutani, however, failed to teach or suggest a recess is formed in said thrust cap at a location opposed to said shaft. In the same field of endeavor, Shiraki suggests (in Fig. 5) a recess (at center of 3) is formed in thrust cap (3) at a location opposed to shaft (9). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to make a thrust cap with a recess by combining the teachings of Shiraki with that of Fukutani to minimize the interference to thrust pressure by external contact.

As for claim 3, Fukutani and Shiraki clearly show and disclose the claimed invention as applied to claim 2 above. Shiraki further teaches (in Figs. 1 and 5) a protrusion (portion marked 44 in Fig. 1) is formed on a center of a lower end surface of shaft (9), and a protrusion projecting toward said shaft is formed on a center of the recess of thrust cap (3) at a location opposed to said shaft (9).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to make a protrusion at the lower end of the shaft and a protrusion on the thrust cap by combining the teachings of Shiraki with that of Fukutani to avoid an necessary friction at the contact of shaft end and cap.

As for claim 4, Fukutani and Shiraki clearly show and disclose the claimed invention as applied to claim 2 above. Shiraki further teaches (in Figs. 1 and 5) a lower end surface of shaft (5) is formed into a spherical shape, thereby forming protrusion,

and an upper surface of the recess of thrust cap (3) is formed into a spherical shape, thereby forming protrusion.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to make the shape of protrusions at the lower end of the shaft and the thrust cap by combining the teachings of Shiraki with that of Fukutani to avoid an necessary friction at the contact of bearing tip and cap.

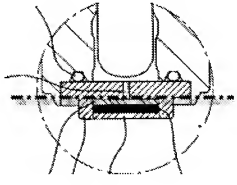
As for claim 6, Fukutani and Shiraki clearly show and disclose the claimed invention as applied to claim 2 above. Shiraki further teaches (in Fig. 1) the thrust sheet (45) is thinner than a recess amount of thrust cap (47) provided between thrust cap (47) and shaft (25). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to make the thrust sheet thinner than recess amount of cap by combining the teachings of Kobayashi with those of Fukutani and Shiraki to reduce the height of the motor.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukutani et al (US 6700256) in view of Shiraki et al (US 6465927) and in further view of Kim (US 2004/0032176).

As for claim 5, Fukutani and Shiraki clearly show and disclose the claimed invention as applied to claim 2 above. None of above prior arts, however, teaches a lower end surface of said thrust cap by said recess has the same height as that of a lower end surface of the swaging portion of the thrust cap of said holder.

In the same field of endeavor, Kim teaches (in Fig. 3) a lower end surface of cap (16) by recess has the same height as that of a lower end surface of the swaging portion of the cap of holder. (see bold dash line in sketch below)

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to make the bottom recess height same as the lower end surface of the swaging portion of thrust cap by combining the teachings of Kim with those of Fukutani and Shiraki to reduce the height of the motor.



Sketch for claim 5

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukutani et al (US 6700256) in view of Shiraki et al (US 6465927) and in further view of Kobayashi al (US 2005/0285473).

As for claim 7, Fukutani and Shiraki clearly show and disclose the claimed invention as applied to claim 2 above. However, none of above prior arts teaches an upper surface of the recess of said thrust cap or a lower end surface of said shaft is coated with a fluorine-based lubricating paint or tungsten.

In the same field of endeavor, Kobayashi teaches an upper surface of the recess of thrust cap (83) or a lower end surface of shaft (42) is coated with fluorine. [0075]

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform fluorine coating at upper surface of thrust cap or lower end surface of shaft by combining the teachings of Kobayashi with those of Fukutani and Shiraki to reduce the sliding loss.

12. Claims 8, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukutani et al (US 6700256) in view of Tamaoka (US 2007/0007841).

As for claim 8, Fukutani clearly show and disclose the claimed invention as applied to claim 1 above. Fukutani, however, failed to teach a recess in motor plate at the location of stator coil insulator. In the same field of endeavor, Tamaoka teaches or suggests (in Fig. 3) a recess (beneath the stator coil) is formed in a motor plate (35) at a location corresponding to a convex portion of an insulator of a coil (magnet coil wound around 32) constituting stator (32 and coils).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a recess in motor plate beneath the stator coils by combining the teachings of Tamaoka with that of Fukutani to reduce the height of the motor.

As for claims 10 and 11, Fukutani clearly show and disclose the claimed invention as applied to claim 1 above. Fukutani, however, failed to teach an outer side of motor plate being projected toward rotor frame. In the same field of endeavor, Tamaoka teaches or suggests (in Fig. 3) a side of motor plate (35) located outside from an outer periphery of rotor frame (33) is projected toward said rotor frame.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to project an outer side of motor plate toward rotor frame by combining the teachings of Tamaoka with that of Fukutani to reduce the thickness of disk driver by mounting the motor at above the motor bottom.

13. Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukutani et al (US 6700256) in view of Karidis (US 4712027).

As for claim 12, Fukutani clearly shows and discloses the claimed invention as applied to claim 1 above. Fukutani, however, failed to teach rotor frame is subjected to nitrogen processing. In the same field of endeavor, Karidis teaches or suggests rotor frame is subjected to nitrogen processing. (col. 9, line 50-57)

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform nitrogen process for the rotor frame by combining the teachings of Karidis with that of Fukutani to locally change the magnetic property of the rotor frame steel.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Regarding to claim 12, the examiner brought Karidis as the rotor frame is believed made from low carbon soft steel since the thickness is so small. However, nitrogen process for rotor assembly can also be found from Reiter Jr. et al (US 2003/0193258) for rotor made from metal powder and Ameen et al (US 2003/0094869) for rotor shaft wear protection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN K. KIM whose telephone number is (571)270-5072. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on 703-585-9637. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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JK

/Charles D. Garber/

Supervisory Patent Examiner, Art Unit 4125